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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/601,458	06/23/2003	Claus Emmer	P5954CIP	9736

28465 7590 04/06/2006

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EXAMINER	
DWIVEDI, VIKANSHA S	
ART UNIT	**PAPER NUMBER**
3746	

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/601,458	EMMER ET AL.	
	Examiner	Art Unit	
	Vikansha S. Dwivedi	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/03/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

The priority claimed for the application has been acknowledged.

Information Disclosure Statement

Applicant Information Disclosure Statement submitted on 11/03/2003 is acknowledged. Since the submission complies with 37CFR 1.97 and 1.98 the references listed therein have been considered. An initialed and dated copy of Applicant's IDS form 1449 is attached to the instant Office action.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 1-20 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1-24 of U.S. Patent No. 6,581,390 in view of E.C. Ekstromer (U.S. Patent number 1,790,203).

The claims of the patent recite:

1. A cryogenic fluid delivery system comprising: a. a storage tank containing a supply of cryogenic liquid; b. a pump including: i) a pumping cylinder having an inlet in communication with said storage tank, an outlet and a pumping piston slidingly positioned therein so that cryogenic liquid from the storage tank is pumped through the pumping cylinder outlet by motion of the pumping piston; ii) an actuating cylinder having an inlet, an outlet and an actuating piston slidingly positioned therein; iii) a connecting rod joining said pumping and actuating pistons; c. a heat exchanger in circuit between the pumping cylinder outlet and the actuating cylinder inlet, said heat exchanger vaporizing a portion of the pumped cryogenic liquid so that said actuating piston is propelled by the resulting cryogenic vapor and said pumping piston is moved by the connecting rod; and d. a liquid delivery line also in communication with the pumping cylinder outlet so that a portion of the pumped cryogenic liquid may be delivered therethrough.

2. The system of claim 1 further comprising a pressure control circuit positioned within said liquid delivery line, said pressure control circuit selectively increasing the pressure within said liquid delivery line so that a greater portion of pumped cryogenic liquid may be directed to said heat exchanger.

3. The system of claim 1 further comprising: e. a gas and liquid mixer in communication with the actuating cylinder outlet and the liquid delivery line so that said gas and liquid mixer receives cryogenic liquid from the liquid delivery line and cryogenic vapor from the actuating cylinder outlet so that the cryogenic liquid is warmed by the cryogenic vapor to a desired temperature; and f. a conditioned liquid dispensing line also in communication with the gas and liquid mixer so that the warmed cryogenic liquid may be dispensed therefrom.

4. The system of claim 3 further comprising a pressure control circuit positioned in said liquid delivery line, said pressure control circuit selectively increasing the pressure within said liquid delivery line so that a greater portion of the pumped cryogenic liquid may vaporized and ultimately directed to said gas and liquid mixer so that greater heating of the cryogenic liquid occurs therein.

5. The system of claim 1: wherein said pumping cylinder is divided by said pumping piston into a first chamber and a second chamber, each of which includes an inlet and an outlet; and further comprising: e. first and second inlet check valves in communication with the inlets of the first and second pumping cylinder chambers, respectively; f. first and second outlet check valves in communication with the outlets of the first and second pumping cylinder chambers, respectively; and g. said check valves cooperating to permit cryogenic liquid to flow into said first pumping cylinder chamber and out of said second pumping cylinder chamber when said pumping piston moves in a first direction and out of said first pumping cylinder chamber and into said second pumping cylinder chamber when said pumping piston moves in a second direction that is opposite of the first direction.

6. The system of claim 5: wherein said actuating cylinder is divided by said actuating piston into a first chamber and a second chamber, each of which includes an inlet; and further comprising an automated control valve in circuit between the heat exchanger and the actuating cylinder inlets, said automated control valve introducing cryogenic vapor into said first and second actuating cylinder chambers in an alternating fashion thereby propelling the actuating piston in the first and second directions in a reciprocating fashion so that said pumping piston is moved in the first and second directions in a reciprocating fashion.

7. The system of claim 6 further comprising first and second limit switches, a stroke change cam attached to said connecting rod and a controller, said controller in communication with the automated control valve and the first and second limit switches, said stroke change cam tripping said first limit switch when said actuating and pumping pistons have traveled to a first position and said stroke change cam tripping the second limit switch when said actuating and pumping pistons have traveled to a second position, said controller reconfiguring said automated control valve whenever said first and second limit switches are tripped so that cryogenic vapor is redirected to a different chamber of the actuating cylinder.

8. The system of claim 1: wherein said actuating cylinder is divided by said actuating piston into a first chamber and a second chamber, each of which includes an inlet; and further comprising an automated control valve in circuit between the heat exchanger and the actuating cylinder inlets, said automated control valve introducing cryogenic vapor into said first and second actuating cylinder chambers in an alternating fashion thereby propelling the actuating piston in first and second directions in a reciprocating fashion so that said pumping piston is moved in the first and second directions in a reciprocating fashion.

9. The system of claim 8 further comprising first and second limit switches, a stroke change cam attached to said

connecting rod and a controller, said controller in communication with the automated control valve and the first and second limit switches, said stroke change cam tripping said first limit switch when said actuating and pumping pistons have traveled to a first position and said stroke change cam tripping the second limit switch when said actuating and pumping pistons have traveled to a second position, said controller reconfiguring said automated control valve whenever said first and second limit switches are tripped so that cryogenic vapor is redirected to a different chamber of the actuating cylinder.

10. The system of claim 1 further comprising a surge tank containing a supply of pressurized gas, said surge tank selectively communicating with the inlet of the actuating cylinder so that said actuating piston may be propelled by the pressurized gas from the surge tank.

11. A pump for transferring cryogenic fluid from a storage tank comprising: a. a pumping cylinder housing defining a pumping cylinder, said pumping cylinder having an inlet adapted to communicate with said storage tank, an outlet and a pumping piston slidingly positioned therein so that cryogenic liquid from the storage tank is pumped through the pumping cylinder outlet by motion of the pumping piston; b. an actuating cylinder housing defining an actuating cylinder, said actuating cylinder having an inlet, an outlet and an actuating piston slidingly positioned therein, said actuating piston joined to said pumping piston by a connecting rod; and c. a heat exchanger in circuit between the pumping cylinder outlet and the actuating cylinder inlet, said heat exchanger vaporizing a portion of pumped cryogenic liquid so that said actuating piston is propelled by the resulting cryogenic vapor and said pumping piston is moved by the connecting rod.

12. The pump of claim 11 further comprising: d. a liquid delivery line also in communication with the pumping cylinder outlet and adapted to communicate with a use device so that a portion of the pumped cryogenic liquid may be delivered to the use device.

13. The pump of claim 12 further comprising a pressure control circuit positioned within said liquid delivery line, said pressure control circuit selectively increasing the pressure within said liquid delivery line so that a greater portion of pumped cryogenic liquid may be directed to said heat exchanger.

14. The pump of claim 12 further comprising: e. a gas and liquid mixer in communication with the actuating cylinder outlet and the liquid delivery line so that said gas and liquid mixer receives cryogenic liquid from the liquid delivery line and cryogenic vapor from the actuating cylinder outlet so that the cryogenic liquid is warmed by the cryogenic vapor to a desired temperature; and f. a conditioned liquid dispensing line also in communication with the gas and liquid mixer so that the warmed cryogenic liquid may be dispensed therefrom.

15. The pump of claim 14 further comprising a pressure control circuit positioned in said liquid delivery line, said pressure control circuit selectively increasing the pressure within said liquid delivery line so that a greater portion of the pumped cryogenic liquid may vaporized and ultimately directed to said gas and liquid mixer so that greater heating of the cryogenic liquid occurs therein.

16. The pump of claim 11: wherein said pumping cylinder is divided by said pumping piston into a first chamber and a second chamber, each of which includes an inlet and an outlet; and further comprising: d. first and second inlet check valves in communication with the inlets of the first and second pumping cylinder chambers, respectively; e. first and second outlet check valves in communication with the outlets of the first and second pumping cylinder chambers, respectively; and f. said check valves cooperating to permit cryogenic liquid to flow into said first pumping cylinder chamber and out of said second pumping cylinder chamber when said pumping piston moves in a first direction and out of said first pumping cylinder chamber and into said second pumping cylinder chamber when said pumping piston moves in a second direction that is opposite of the first direction.

17. The pump of claim 16: wherein said actuating cylinder is divided by said actuating piston into a first chamber and a second chamber, each of which includes an inlet; and further comprising an automated control valve in circuit between the heat exchanger and the actuating cylinder inlets, said automated control valve introducing cryogenic vapor into said first and second actuating cylinder chambers in an alternating fashion thereby propelling the actuating piston in the first and second directions in a reciprocating fashion so that said pumping piston is moved in the first and second directions in a reciprocating fashion.

18. The pump of claim 17 further comprising first and second limit switches, a stroke change cam attached to said connecting rod and a controller, said controller in communication with the automated control valve and the first and second limit switches, said stroke change cam tripping said first limit switch when said actuating and pumping pistons have traveled to a first position and said stroke change cam tripping the second limit switch when said actuating and pumping pistons have traveled to a second position, said controller reconfiguring said automated control valve whenever said first and second limit switches are tripped so that cryogenic vapor is redirected to a different chamber of the actuating cylinder.

19. The pump of claim 11: wherein said actuating cylinder is divided by said actuating piston into a first chamber and a second chamber, each of which includes an inlet; and further comprising an automated control valve in circuit between the heat exchanger and the actuating cylinder inlets, said automated control valve introducing cryogenic vapor into said first

and second actuating cylinder chambers in an alternating fashion thereby propelling the actuating piston in first and second directions in a reciprocating fashion so that said pumping piston is moved in the first and second directions in a reciprocating fashion.

20. The pump of claim 19 further comprising first and second limit switches, a stroke change cam attached to said connecting rod and a controller, said controller in communication with the automated control valve and the first and second limit switches, said stroke change cam tripping said first limit switch when said actuating and pumping pistons have traveled to a first position and said stroke change cam tripping the second limit switch when said actuating and pumping pistons have traveled to a second position, said controller reconfiguring said automated control valve whenever said first and second limit switches are tripped so that cryogenic vapor is redirected to a different chamber of the actuating cylinder.

21. The pump of claim 11 further comprising a surge tank containing a supply of pressurized gas, said surge tank selectively communicating with the inlet of the actuating cylinder so that said actuating piston may be propelled by the pressurized gas from the surge tank.

22. The pump of claim 11 further comprising a gas delivery line in communication with the actuating cylinder outlet and adapted to communicate with a use device so that cryogenic vapor from the actuating cylinder may be provided to the use device.

23. A method for transferring a cryogenic liquid from a storage tank to a use device comprising the steps of: a. providing a cryogenic liquid pump that operates on cryogenic vapor; b. connecting the storage tank and use device to the cryogenic liquid pump; c. pumping cryogenic liquid from the storage tank; d. directing a portion of the pumped cryogenic liquid to the use device; e. vaporizing a remaining portion of the pumped cryogenic liquid that was not directed to the use device; and f. directing the cryogenic vapor to the pump so that the pump is powered by the cryogenic vapor.

24. The method of claim 23 further comprising the step of combining cryogenic vapor exhaust produced by the pump with the portion of the pumped cryogenic liquid that was directed to the use device so that the cryogenic liquid is heated prior to its arrival to the use device.

Emmer et al discloses the invention substantially as claimed in the present application except the supplemental linear actuator. Ekstromer provides teachings for a pneumatic motive power unit with a reciprocating pump 15 and also how it is beneficial

to use more than one in an assembly (Page 2, column 2, lines 82-86). At the time of invention was made it would have been obvious to use two actuators connected to each other to facilitate the assembly and provide the required amount of power to the assembly.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vikansha S. Dwivedi whose telephone number is 571-272-7834. The examiner can normally be reached on M-F, 8-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy S. Thorpe can be reached on 571-272-4444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

VSD

TAE JUN KIM
PRIMARY EXAMINER